What is claimed is:

1. A method of making a photovoltaic cell, the method comprising:
contacting a cross-linking agent with semiconductor particles; and
incorporating the semiconductor particles into the photovoltaic cell.

2. The method of claim 1, wherein the cross-linking agent comprises an organometallic molecule.

3. The method of claim 1, wherein the cross-linking agent and the semiconductor particles each comprise an identical chemical element.

4. The method of claim 3, wherein the chemical element is a metal.

5. The method of claim 3, wherein the chemical element is selected from a group consisting of titanium, zirconium, and zinc.

6. The method of claim 1, wherein the cross-linking agent and the semiconductor particles comprise an identical chemical bond.

7. The method of claim 6, wherein the chemical bond is a metal to non-metal bond.

8. The method of claim 6, wherein the chemical bond is a metal-oxygen bond.

9. The method of claim 1, wherein the cross-linking agent is a material selected from a group consisting of metal alkoxides, metal acetates, and metal halides.

10. The method of claim 1, wherein the cross-linking agent comprises a sol-gel precursor.

11. The method of claim 1, further comprising applying a dye on the semiconductor particles.

12. The method of claim 1, wherein the semiconductor particles are disposed on a first substrate.

13. The method of claim 12, further comprising electrically connecting a second substrate to the first substrate.

14. The method of claim 13, wherein the semiconductor particles are disposed between the first and second substrates.

15. The method of claim 13, wherein the second substrate is flexible.

16. The method of claim 13, wherein the second substrate comprises a polymeric material.

17. The method of claim 16, wherein the polymeric material is selected from a group consisting of polyethyleneterephthalate and polyethylenenaphthalate.

18. The method of claim 16, wherein the second substrate comprises a polyimide.

19. The method of claim 12, further comprising heating the first substrate to less than about 400 °C.

20. The method of claim 12, wherein the first substrate is flexible.

21. The method of claim 12, wherein the first substrate comprises a polymeric material.

22. The method of claim 21, wherein the polymeric material is selected from a group consisting of polyethyleneterephthalate and polyethylenenaphthalate.

23. The method of claim 21, wherein the substrate comprises a polyimide.

24. The method of claim 1, further comprising incorporating a polymeric electrolyte into the photovoltaic cell.

25. A method of making a photovoltaic cell, the method comprising:

(a) contacting titanium oxide particles with a first flexible polymeric substrate to form a titanium oxide film on the first substrate;

(b) contacting the titanium oxide film with titanium alkoxide to cross-link the particles;

(c) contacting the titanium oxide film with a dye;

(d) contacting the titanium oxide film with a polyelectrolyte; and

(e) applying a second flexible polymeric substrate on the polyelectrolyte to form the cell.

26. A method of making a photovoltaic cell, the method comprising:

(a) continuously forming a first electrode comprising:

a flexible polymeric first substrate;

a titanium oxide film disposed on the first substrate;

a dye comprising ruthenium disposed on the titanium oxide film; and

a polyelectrolyte disposed on the titanium oxide film;

(b) continuously forming a second electrode comprising:

a flexible polymeric second substrate; and

a catalyst layer comprising platinum disposed on the second substrate; and

(c) continuously connecting the first and second electrodes to form the cell.

27. A photovoltaic cell, comprising:

a first substrate having cross-linked semiconductor particles disposed thereon; and

a second substrate electrically connected to the first substrate.

28. The cell of claim 27, wherein one of the substrates is flexible.

29. The cell of claim 27, wherein one of the substrates comprises a polymeric material.

30. The cell of claim 27, wherein one of the substrates comprises a polyimide.

31. The cell of claim 27, wherein the semiconductor particles are between the first and second substrates.

32. The cell of claim 31, further comprising a polymeric polyelectrolyte between the first and second substrates.

33. The cell of claim 32, wherein the polyelectrolyte comprises:
about 5% to about 100% by weight of a polymer;
about 5% to about 95% by weight of a plasticizer; and
about 0.5M to about 10M of a redox electrolyte.

34. The cell of claim 27, further comprising a dye disposed on the semiconductor particles.

35. The cell of claim 27, wherein the semiconductor particles are crosslinked by a material comprising a chemical element that is of the same type as a chemical element in the semiconductor particles.

36. The cell of claim 35, wherein the chemical element is a metal.

37. The cell of claim 35, wherein the chemical element is selected from a group consisting of titanium, zirconium, and zinc.

38. The cell of claim 27, wherein the semiconductor particles are crosslinked by a material comprising an identical chemical bond as in the semiconductor particles.

39. The cell of claim 38, wherein the chemical bond is a metal to non-metal bond.

40. The cell of claim 38, wherein the chemical bond is a metal-oxygen bond.

41. The cell of claim 27, wherein both of the substrates are flexible.

42. The cell of claim 27, wherein both of the substrates comprise a polymeric material.

43. A method of fabricating a photovoltaic cell, the method comprising:

(a) forming a first electrode comprising semiconductor particles disposed on a flexible substrate;

(b) forming a second electrode comprising a second substrate; and

(c) continuously joining the first and second electrodes to form the photovoltaic cell.

44. The method of claim 43, wherein step (a) comprises contacting the semiconductor particles with a cross-linking agent.

45. The method of claim 43, wherein step (a) comprises heating the first electrode to less than about 400 °C.

46. The method of claim 45, wherein heating is performed after contacting the particles with a cross-linking agent.

47. The method of claim 43, wherein step (a) comprises applying a polymeric polyelectrolyte to the first electrode.

48. The method of claim 47, wherein the polyelectrolyte comprises about 5% to about 100% by weight of a polymer, about 5% to about 95% by weight of a plasticizer and about 0.5M to about 10M of a redox electrolyte.

49. The method of claim 43, wherein the second substrate is flexible.

50. The method of claim 43, wherein step (b) comprises forming a catalyst on the second substrate.

51. The method of claim 43, further comprising contacting the semiconductor particles with a dye.

52. A method of fabricating a photovoltaic cell, the method comprising:

forming a first electrode comprising

(a) applying semiconductor particles onto a flexible first substrate; and

(b) applying a polymeric electrolyte onto the first substrate,

wherein forming the first electrode is performed in a continuous process.

53. The method of claim 52, further comprising contacting a cross-linking agent with the semiconductor particles.

54. The method of claim 53, further comprising heating the first electrode to less than about 400 °C after contacting the cross-linking agent with the semiconductor particles.

55. The method of claim 52, further comprising contacting the particles with a dye.

56. The method of claim 52, further comprising forming a second electrode having a catalyst disposed thereon.

57. The method of claim 56, wherein the second electrode is formed in a continuous process.

58. The method of claim 57, further comprising continuously joining the first and second electrodes to form the photovoltaic cell.

59. A photovoltaic cell, comprising:

a first electrode;

a second electrode; and

a polymeric electrolyte between the first and second electrodes, the electrolyte comprising

about 5% to about 100% by weight of a polymer;

about 5% to about 95% by weight of a plasticizer; and

about 0.5M to about 10M of a redox electrolyte.